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UTILITY PATENT APPLICATION TRANSMITTAL

Only for new nonprovisional applications under 37 C.F.R. § 1.53(b)(2)

Attorney Docket No. Mo-4861/HE-146
 First Inventor or Application Identifier Bernd Willing
 Title DEVICE FOR INSERTING AND REMOVING
 Express Mail Label No. EE415238795US

APPLICATION ELEMENTS

See MPEP chapter 800 concerning utility patent application contents

- ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
 (Submit an original and a duplicate for fee processing)
- ☒ Specification [Total Pages 9]
 (preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawings(s) (35 U.S.C. 113) [Total Sheets 4]
- ☒ Oath or Declaration [Total Pages 2]
 a. ☒ Newly executed (original or copy)
 b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
 (for continuations/divisional with Box 17 completed)
 (Note Box 8 below)
 L ☐ DELETION OF INVENTOR(S)
 Signed statement attached deleting
 inventor(s) named in the prior application,
 see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).
- ☐ Incorporation By Reference (useable if Box 4b is checked)
 The entire disclosure of the prior application, from which a
 copy of the oath or declaration is supplied under Box 4b, is
 considered to be part of the disclosure of the accompanying
 application and is hereby incorporated by reference therein.
- ☐ If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____
 Prior application information: Examiner Group / Art Unit: _____

ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231

- ☐ Microfiche Computer Program (Appendix)
- ☐ Nucleotide and/or Amino Acid Sequence Submission
 (if applicable, all necessary)
 a. ☐ Computer Readable Copy
 b. ☐ Paper Copy (identical to computer copy)
 c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PAPER(S)

- ☒ Assignment Papers (cover sheet & document(s))
- ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
- ☐ English Translation Document (if applicable)
- ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
- ☐ Preliminary Amendment
- ☒ Return Receipt Postcard (MPEP 503)
 (Should be specifically itemized)
- ☐ Small Entity Statement(s) ☐ Statement filed in prior application, (PTO/SB-08-12) Status still proper and desired
- ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)
- ☐ Other: _____

*NOTE: FOR FILING IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEE, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.53), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.53).

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Name Bayer Corporation
 Address Patent Department
100 Bayer Road
 City Pittsburgh State PA Zip Code 15205-9741
 Country U.S.A. Telephone (412) 777-2349 Fax (412) 777-5449

Name (Print/Type) Noiland, Y. Cheung Registration No. (Attorney/Agent) 39,138
 Signature _____ Date 11-18-98

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11/18/98



3525 U.S. PTO

FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1.
 These are the fees effective October 1, 1997.
 Small Entity payments must be supported by a small entity statement,
 otherwise large entity fees must be paid. See Form PTO/SB-09-12.
 See 37 C.F.R. §§ 1.27 and 1.28.

TOTAL AMOUNT OF PAYMENT (\$) 800.00

Complete if Known

Application Number To Be Assigned
 Filing Date Herewith
 First Named Inventor Bernd Willing
 Examiner Name ---
 Group / Art Unit ---
 Attorney Docket No. Mo-4861/HE-146

METHOD OF PAYMENT (check one)

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number 13-3848
 Deposit Account Name Bayer Corporation

- ☒ Charge Any Additional Fee Required Under 37 C.F.R. §§ 1.16 and 1.17 ☐ Charge the Issue Fee Set in 37 C.F.R. § 1.18 at the Issuing of the Notice of Allowance

2. ☐ Payment Enclosed:
☐ Check ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee	Fee	Fee	Fee	Description	Fee Paid
(1)	(2)	(3)	(4)	(5)	(6)		
101	790	201	395			Utility filing fee	760.00
106	330	206	165			Design filing fee	
107	540	207	270			Plant filing fee	
108	790	208	395			Release filing fee	
114	150	214	75			Provisional filing fee	
SUBTOTAL (1) (\$)							760.00

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
6	20	X	
1	3	X	
Multiple Dependent			

**or number previously paid, if greater. For Releases, see below

Large Entity	Small Entity	Fee	Fee	Fee	Fee	Description	Fee Paid
(1)	(2)	(3)	(4)	(5)	(6)		
103	22	203	11			Claims in excess of 20	
102	82	202	41			Independent claims in excess of 3	
104	270	204	135			Multiple dependent claim, if not paid	
109	82	209	41			Release independent claims over original patent	
110	22	210	11			Release claims in excess of 20 over original patent	
SUBTOTAL (2) (\$)							

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee	Fee	Fee	Fee	Description	Fee Paid
(1)	(2)	(3)	(4)	(5)	(6)		
106	130	206	85			Surcharge - late filing fee or oath	
127	50	227	25			Surcharge - late provisional filing fee or cover sheet	
138	130	139	130			Non-English specification	
147	2,520	147	2,520			For filing a request for reexamination	
112	920*	112	920*			Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*			Requesting publication of SIR after Examiner action	
115	110	215	55			Extension for reply within first month	
116	400	216	200			Extension for reply within second month	
117	860	217	475			Extension for reply within third month	
118	1,510	218	755			Extension for reply within fourth month	
128	2,060	228	1,030			Extension for reply within fifth month	
119	310	219	155			Notice of Appeal	
120	310	220	155			Filing a brief in support of an appeal	
121	270	221	135			Request for oral hearing	
138	1,510	138	1,510			Petition to institute a public use proceeding	
140	110	240	55			Petition to revive - unrevokable	
141	1,320	241	660			Petition to revive - unintentional	
142	1,320	242	660			Utility issue fee (or release)	
143	450	243	225			Design issue fee	
144	870	244	335			Plant issue fee	
122	130	122	130			Petitions to the Commissioner	
123	50	123	50			Petitions related to provisional applications	
126	240	126	240			Submission of Information Disclosures Stmt	
581	40	581	40			Recording each patent assignment per property (time number of properties)	40.00
146	790	246	395			Filing a submission after final rejection (37 C.F.R. 1.129(a))	
149	790	249	395			For each additional invention to be examined (37 C.F.R. 1.129(b))	
Other fee (specify) _____							
Other fee (specify) _____							
* Reduced by Basic Filing Fee Paid							
SUBTOTAL (3) (\$)							40.00

SUBMITTED BY

Typed or Printed Name Noland J. Cheung

Signature

Date

11-18-98

Complete (if applicable)

Reg. Number 39,138

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5

DEVICE FOR INSERTING AND REMOVING
WORK STATIONS CIRCULATING ON A CHAIN

BACKGROUND OF THE INVENTION

To carry out a uniform sequence of working steps at a plurality of work stations, frequently, each individual working step is repeated at a stationary position, wherein a plurality of work stations, driven on a belt or a chain, passes by the location in which each particular working step is carried out.

A uniform sequence of working steps may, for example, be the assembly of a device, wherein the various assembly steps are carried out at different locations and the part to be assembled is moved on a work station from location to location for the various assembly steps to be carried out. A similar arrangement may be used in the production of molded parts, in which the working steps comprise cleaning the mold, providing the mold with a release agent, inserting a displacement body, filling the mold for the first time, curing the first molded part, removing the displacement body, filling the mold for the second time, curing the second mold contents, opening the mold and removing the molded part. Such working steps are carried out at different locations, wherein the mold is conveyed on a work station from one location to the other.

The work stations may take the form of work station wagons, wherein the work station wagons are moved by means of connection elements to the circulating chain drive which are provided and/or engaged on the wagons on one side.

The design of work stations in the form of independent work station wagons is particularly applicable when the initial and/or subsequent fitting out of the work station, or intermediate working steps which cannot be carried out on the chain, are carried out away from the conveyor system in

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Donna J. Veatch

(Name of person mailing paper or fee)

Donna J. Veatch
Signature of person mailing paper or fee)

terms of location. In this case, it may be necessary to remove individual work station wagons from the chain cycle and/or insert them into it.

SUMMARY OF THE INVENTION

- The present invention relates to a device for carrying out a
- 5 sequence of working steps on travelling work station wagons comprising
- a) an oval track wherein said work station wagons are circulating, wherein said wagons comprise at least one detachable connection element connected to a circulating chain which moves said wagons;
- 10 b) at least one insertion and at least one removal guide track is provided on the outside of said oval track, wherein said at least one insertion and at least one removal guide track comprises a transfer point to which the chain is allocated;
- c) at least one coupling element is further provided at each
- 15 transfer point via which the wagons may be coupled into the guide tracks on the side opposite of the side of said wagons comprising at least one detachable element, with at least one switchable points element located on said guide track, which during the insertion position, release said at least one coupling element and bring about the engagement of said
- 20 detachable connection element to said chain or during the removal position, couple the coupling elements and removably detach said at least one detachable connection from said chain.

BRIEF DESCRIPTION OF THE DRAWINGS

- Fig. 1 is a diagram of the device of the present invention.
- 25 Fig. 2 is an enlarged diagram of the device of the present invention showing the circulating chain drive with a guide channel.
- Fig. 3 shows an enlarged view of the points tongues of the device of the present invention.
- Fig. 4 shows an enlarged view of the insertion of wagon X into the
- 30 device of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a device for carrying out a uniform sequence of working steps on travelling work station wagons circulating on an oval track, wherein the wagons are moved by means of detachable connection elements to a circulating chain drive. The detachable connection elements are provided and/or engaged on one side of the wagon. The device of the present invention also composes at least one insertion and at least one removal guide track, to each of which a transfer point to the chain is allocated and is provided on the outside of this oval conveyor system. Coupling elements are further provided via which the wagons may be coupled into the guide tracks. On the other side of the wagon, switchable points elements are provided, in which insertion/-removal positions release the connection elements and couple the coupling elements for removal purposes and/or uncouple the coupling elements and bring about the engagement of the connection elements for insertion purposes, which are provided at each transfer point.

An embodiment of the present invention comprises the chain circulating in an oval, for example, and the chain running in a guide channel. The wagons have guide rollers running on vertically projecting mountings in the guide channel and the wagons also comprise at least one carrier pin, wherein carrier cages located on the chain removably engage the carrier pin on the wagon. On the chain side, the transfer point may be designed in such a way that the outer boundary of the guide channel is interrupted so that the guide rollers may emerge laterally out of the guide channel and the carrier pin laterally out of the carrier cage which is open towards the outside.

In an embodiment of the present invention, the insertion and removal tracks may take the form of guide channels which are arranged parallel to the chain drive and at a distance from its guide channel, wherein the distance between the chain and the guide channel of the

insertion/removal track approximately corresponds to the width of the work station wagon. On the outside of the wagon, guide rollers are then also provided, which run in the guide channel of the removal guide track after transfer from the chain to the removal guide track. At the transfer point, the guide channel of the removal guide track has interruptions, which are closed by means of points tongues if no transfer is to take place. If the wagon, which passed by the transfer point is to be removed, the points tongues are switched in such a way that they guide the guide rollers of the wagon into the guide channel of the removal track.

- 10 The insertion point is correspondingly designed. When inserting a wagon, care should be taken to ensure that the work station wagon is inserted in an accurately positioned manner with respect to the connection element to the chain, and with respect to the embodiment of the present invention, that the carrier pin of the wagon is introduced into the carrier cage of the chain.

- 15 Therefore, the present invention preferably provides that each work station wagon has a spacer with respect to the next wagon, wherein the spacing of the connection element parts on the chain (i.e., the carrier cages) have a spacing which corresponds to the length of the wagon and spacer combined. In this way, the wagon to be inserted is inserted at the free place on the chain, wherein the following wagon with its spacer pushes the wagon to be inserted precisely into the position in which the connection to the chain takes place.

- 20 Preferably, the insertion guide track has a load-dependent drive in which the maximum speed is higher than the chain speed. Preferably, the insertion guide track has a friction drive, which engages on the outer side (relative to the oval) of the wagon. This ensures that prior to transfer, the wagon to be inserted has a higher speed than the following wagon on the chain, so that during the transfer, the wagon to be inserted is pushed into the transfer position by the spacer of the following wagon.

The invention will be explained in greater detail with the aid of the drawings which follow:

Fig. 1 shows a carousel 10, with the chain 1, circulating in an oval, on which the work station wagons denoted by Roman numerals circulate. A removal guide track 20 and an insertion guide track 30 are also shown in diagrammatic form. The transfer points are denoted by the broken-lined circles 21 and 31.

The enlarged view of Fig. 2 shows that the circulating chain drive 1 comprising a guide channel 2, which is formed by the two guide strips 5 and 6, wherein the drive chain 3 runs inside the guide channel 2. The chain has carrier cages 4a, 4b, functioning as a connection element part on the chain side to receiving such connection element from the wagon. The carrier cages 4a, 4b are arranged at a regular spacing. Guide rollers 7a, 7b, which run in the channel 2 as long as the wagon is guided on the chain are provided laterally on the work station wagons denoted by Roman numerals and are removably fastened to carrier cages 4a and 4b, respectively.

The removal guide track 20 also consists of a channel 22, which is formed by guide strips 25 and 26. On the side facing away from the chain drive the work station wagons have guide rollers 8a and 8b which in the event of transfer are engaged by switchable points tongues 27a and 27b and are guided into the guide channel 22 of the removal guide track 20; see wagon II. On the side opposite the points 27a and 27b, the guide strip 5 comprises a break or interruption so that the guide rollers 7a and 7b belonging to the wagon to be removed, are moved out of the guide channel 2 and out of the carrier cage 4a and 4b, respectively.

Fig. 3 shows an enlarged view of the points tongues, wherein the numerals denote elements identical with Fig. 2. The top view shows the points tongues in the "transit" position, the bottom view shows the points tongues in the "transfer" position.

Fig. 4 shows the insertion of wagon X, still in the waiting position in Fig. 2, at the position in which wagon II is removed in Fig. 2. The end phase of the insertion, which explains the correct position for connection to the chain 3, is shown. In the region of the deflection 40 of the chain, the work station wagons are considerably wider apart. In this region, wagon X is initially pushed in front of wagon I. At the time of transfer, i.e., when the guide rollers 8a and 8b of wagon X reach the points tongues 37a and 37b, wagon X to be inserted, is accurately positioned between wagons I and III via the spacer 9 so that the guide rollers 7a and 7b are accurately positioned in the carrier cages 4a and 4b of the chain 3.

It will be readily apparent to the person skilled in the art that the connection elements between circulating chain and work station wagons, and the coupling elements to the insertion and removal guide tracks, may be designed differently from the views shown by way of example. For example, they may take the form of switchable electromagnets or rocker heels. It is essential to the invention that the guiding of the work station wagons for the purposes of this invention, insertion takes place on the one side and removal takes place on the other side, so that complicated points, in which that wagons must pass over structures, are avoided on the circulating chain drive. Both the circulating chain drive and the insertion and removal guide tracks may be arranged above the shopfloor without forming obstacles to the work station wagons travelling on their own wheels.

Although the invention has been described in detail in the foregoing for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be limited by the claims.

WHAT IS CLAIMED IS:

1. A device for carrying out a sequence of working steps on travelling work station wagons comprising
- a) an oval track wherein said work station wagons are circulating, wherein said wagons comprise at least one detachable connection element connected to a circulating chain which moves said wagons;
- b) at least one insertion and at least one removal guide track is provided on the outside of said oval track, wherein said at least one insertion and at least one removal guide track comprises a transfer point to which the chain is allocated;
- c) at least one coupling element is further provided at each transfer point via which the wagons may be coupled into the guide tracks on the side opposite of the side of said wagons comprising at least one detachable element, with at least one switchable points element located on said guide track, which during the insertion position, release said at least one coupling element and bring about the engagement of said detachable connection element to said chain or during the removal position, couple the coupling elements and removably detach said at least one detachable connection from said chain.
2. A device according to Claim 1, wherein each work station wagon has a spacer which defines the minimum distance between two wagons on said chain and the distance between said chain wherein said detachable connection element is removably connected to the chain at the transfer point is dimensioned in such a way that the wagons allocated to said detachable connection elements have touch-contact via the spacer.
3. A device according to Claim 1, wherein during insertion or removal of said wagon to said device, during transfer, said wagon to be transferred is pushed into position by the following wagon.

DEVICE FOR INSERTING AND REMOVING
WORK STATIONS CIRCULATING ON A CHAIN

ABSTRACT OF THE DISCLOSURE

A device for carrying out a sequence of working steps on travelling work station wagons comprising an oval track wherein said work station wagons are circulating, wherein said wagons comprise at least one detachable connection element connected to a circulating chain which moves said wagons; at least one insertion and at least one removal guide track is provided on the outside of said oval track, wherein said at least one insertion and at least one removal guide track comprises a transfer point to which the chain is allocated; at least one coupling element is further provided at each transfer point via which the wagons may be coupled into the guide tracks on the side opposite of the side of said wagons comprising at least one detachable element, with at least one switchable points element located on said guide track, which during the insertion position, release said at least one coupling element and bring about the engagement of said detachable connection element to said chain or during the removal position, couple the coupling elements and removably detach said at least one detachable connection from said chain.

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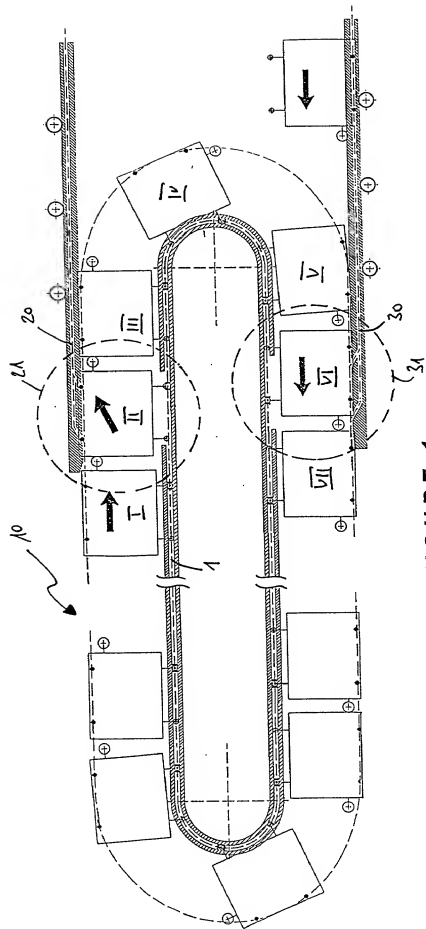


FIGURE 1

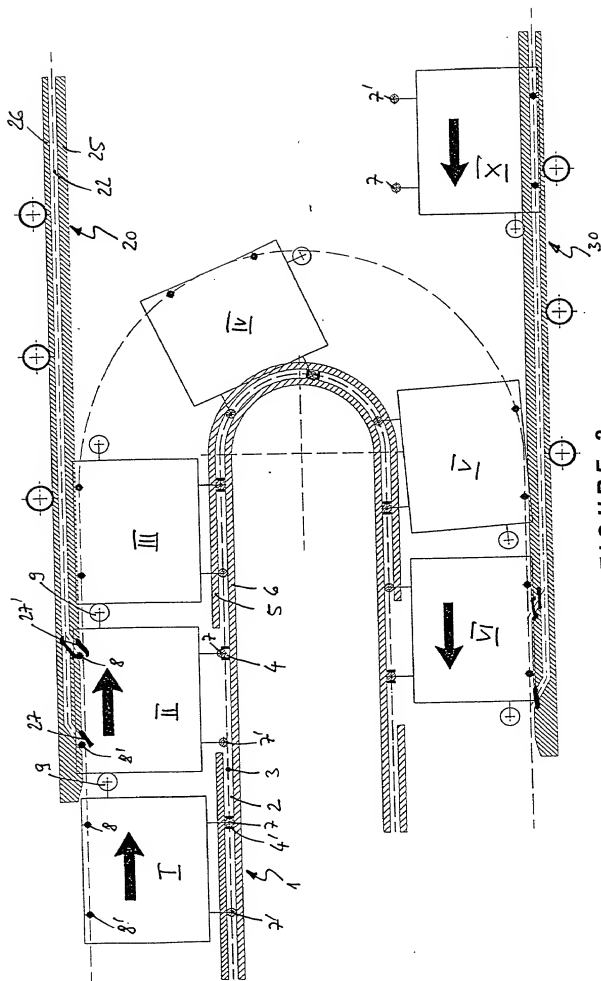


FIGURE 2

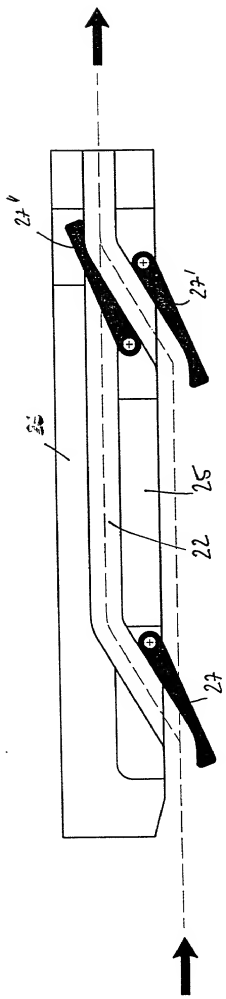
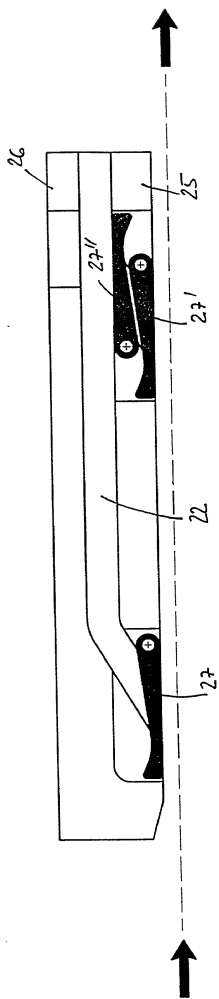


FIGURE 3

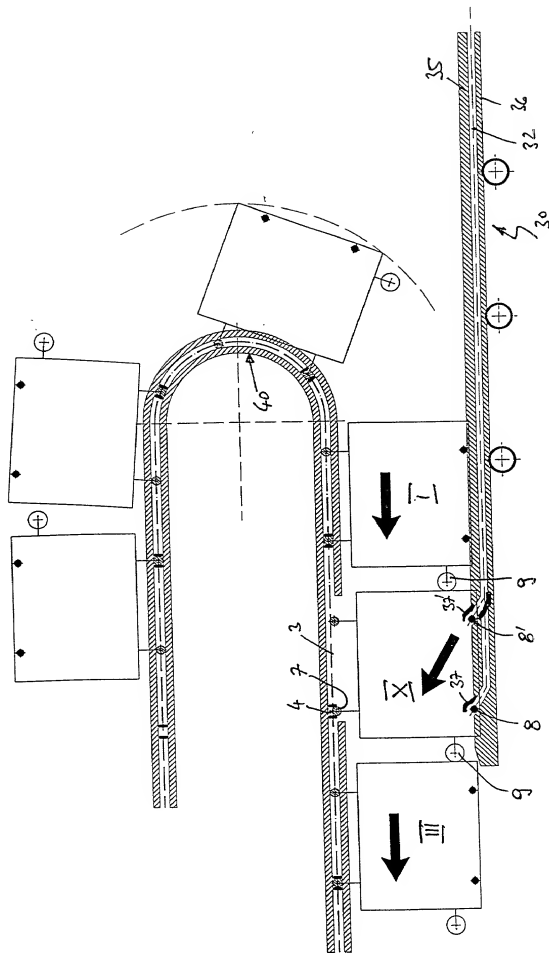


FIGURE 4

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**DEVICE FOR INSERTING AND REMOVING WORK STATIONS
CIRCULATING ON A CHAIN**

the specification of which is attached hereto,

or was filed on _____ as

Application Serial No. _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s), the priority(ies) of which is/are to be claimed:

19752750.7
(Number)

Germany
(Country)

November 28, 1997
(Month/Day/Year Filed)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose the material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)

(Filing Date)

(Status)

(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)

(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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FULL NAME OF SOLE OR FIRST INVENTOR Bernd WILLING		INVENTOR'S SIGNATURE <i>B. Willing</i>	DATE 11/16/98
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0975005-11898